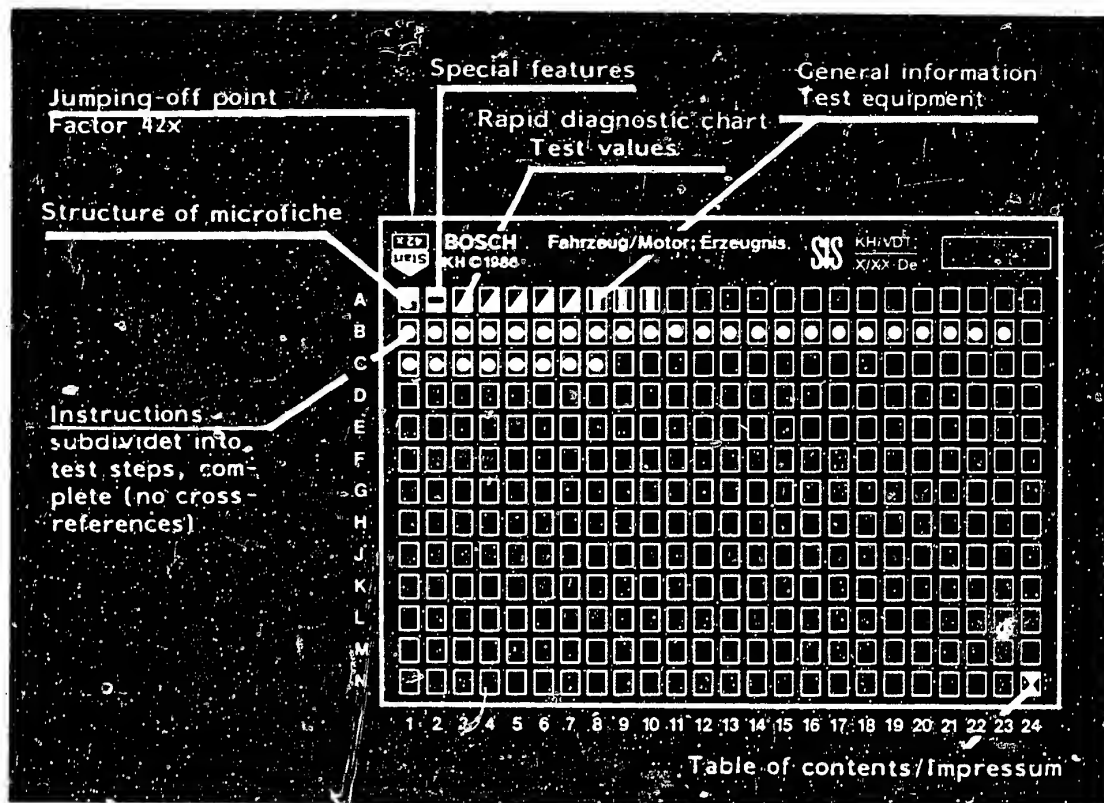


Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

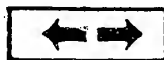
E16	Product/component/test step
	Vehicle/engine

Coordinate

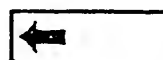
3. Limits of section



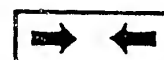
Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

C6

A1

Repair and testing

1. Special features

Microcard for testing and repairing the headlight vertical aim control (LWR) in the Mercedes Benz passenger car models R 107, W 123, W 124, C 126, W 126, W 201 with and without level control. Rapid diagnosis chart and test step sequence are divided up according to vehicles with and without level control.



2. Rapid diagnosis chart for headlight vertical aim control (LWR)

The following rapid diagnosis charts make it possible for the experienced specialist to test the LWR system using the headlight aiming device 0 681 130 .. or 0 684 100 ..

Rapid diagnosis chart for vehicles without level control

Coordinate A4/A5.

Rapid diagnosis chart for vehicles with level control

Coordinate A6/A7.

The contents of this list are restricted to the following information:

- Test step sequence
- Setting instructions and test specifications (readings on headlight aiming device)
- Reference to the coordinates of respective detailed testing and trouble-shooting program.

If detailed information and references are necessary, always proceed per testing and adjustment information starting with Coordinate B1.

Prerequisites for testing

- Tyre pressure OK.
- Vehicle ready to drive (full tank) and unloaded except for 75 kg (driver) (per EEC guideline 76/756).
- Lower beams switched on, leave engine running and give two to three snap accelerations to ensure the availability of 400 mbar vacuum.
- Headlight aiming device set up per operating instructions.

Testing and adjusting must always be carried out for both headlights.



Rapid diagnosis chart for testing with headlight aiming device 0 681 130 .. or 0 684 100

Sedans and coupés without level control

Always carry out testing on both headlights!

Test Step	Set rheostat-type switch in vehicle to:	Set headlight aiming device to:	Set headlights to:	Reading on headlight aiming device	Coordinates
1	Position "0" (Basic setting)	10 cm inclination	Cutoff	.	B 2
2	"v" Position 3 (Headlight pointing downwards)	Cutoff		between 33 cm and 48 cm	B 4
3	Position "0" (Basic setting)	10 cm inclination		Cutoff	B 12

A4

Rapid diagnosis chart

MB pass. cars, headl. vert. aim control



A5

Rapid diagnosis chart

MB pass. cars, headl. vert. aim control



Rapid diagnosis chart for testing with headlight aiming device 0 68 30 .. or 0 684 100

Sedans and coupés with level control and T sedans

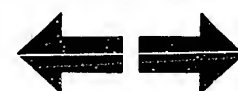
Always carry out testing on both headlights!

Test Step	Set rheostat-type switch in vehicle to:	Set headlight aiming device to:	Set headlights to:	Reading on headlight aiming device	Coordinates
1a	Position "0" (Basic setting)	10 cm inclination	Cutoff		B 14
2a	"v" Position 2 (Headlight pointing downwards)	Cutoff		between 28 cm and 35 cm	B 16
3a	Position "0" (Basic setting)	23 cm inclination	Cutoff		B 18
4a	"1" Position A (Headlight pointing upwards)	Cutoff		between 16 cm and 10 cm	B 20
5a	Position "0" (Basic setting)	10 cm inclination		Cutoff	C 7

A6

Rapid diagnosis chart

MB pass. cars, headl. vert. aim control



A7

Rapid diagnosis chart

MB pass. cars, headl. vert. aim control



3. General information

The rheostat-type switch for the headlight vertical aim control (LWR system 0 307 6..) is located on the dashboard (near headlight switch).

On testing the headlight vertical aim control system, a differentiation must be made between vehicles with and without level control.

Basic setting of the headlights is undertaken in test step 1.

Note: Basic setting is with reference to EEC setting regulations.

In countries outside Germany the local regulations must be observed.

Testing information: Owing to their greater accuracy, the pressure gauges of a Bosch vacuum tester should be used. In the case of older testers with an "mmHg scale", the vacuum level must be converted correspondingly.

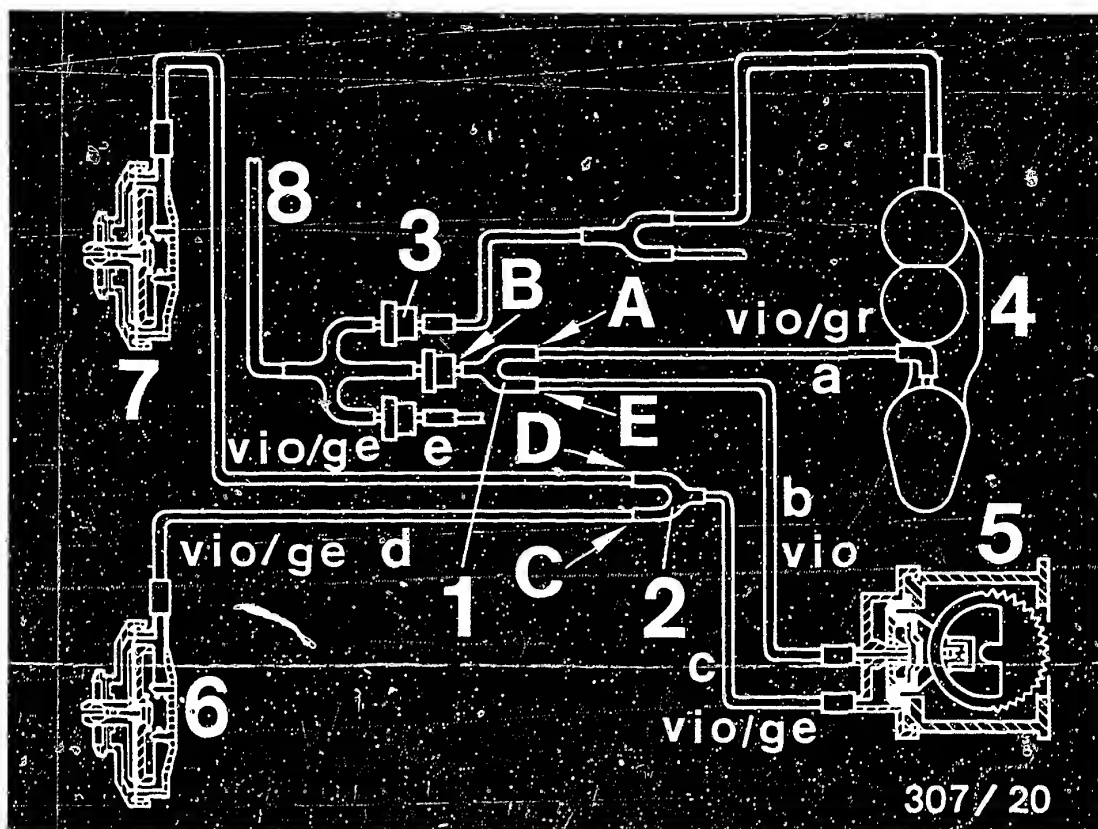
Example: $\frac{\text{mbar}}{1.33} = \text{mmHg}$; e.g. $\frac{450 \text{ mbar}}{1.33} = 338.3 \text{ mmHg}$

or

$\text{mmHg} \times 1.33 = \text{mbar}$; e.g. $338.3 \text{ mmHg} \times 1.33 = \sim 450 \text{ mbar}$

Service-parts information: Control and supply line, supply reservoir and non-return valve are original MB service parts.





3.1 Schematic diagram of vacuum system

A,B,C,D,E = Test connections

a = Line to supply reservoir (violet/gray)
 b = Line to rheostat-type switch input (violet)
 c = Line to rheostat-type switch output (violet/yellow)
 d = Line to control element left (violet/yellow)
 e = Line to control element right (violet/yellow)

1,2 = Branch pieces
 3 = Non-return valve
 4 = Vacuum supply reservoir
 5 = Rheostat-type switch
 6 = Actuator left
 7 = Actuator right
 8 = From vacuum connection to engine



4. Test equipment

Headlight aiming device	0 681 130 ...
or	
Headlight aiming device	0 684 100 ...
Vacuum tester e.g. ETT 0007.00	0 684 100 700
or	
Pressure/vacuum tester	
e.g. ETT 007.01	0 684 100 701
Vacuum pump e.g. Mityvac	
made by Korinth Co., Ludwig-Kloos-Str. 21	
D-6450 Hanau 7 - Steinheim, West Germany	

A10

Test equipment

MB pass. cars, headl. vert. aim control



5. Testing and repair

Prerequisites for testing the LWR system:

- Tyre pressure OK
- Vehicle ready to drive (full tank) and unloaded except for 75 kg (driver) (per StVZO § 42 Sect. 3)
- Lower beam switched on, leave engine running and give two to three snap accelerations to ensure the availability of 400 mbar vacuum.
- Headlight aiming device set up per operating instructions.

Testing and adjusting must always be carried out for both headlights.

Notes:

For detailed testing and trouble-shooting, carry out the test steps sequentially starting with Coordinate B 1 (vehicles without level control) and with B 14 (vehicles with level control).

Continue with the trouble-shooting given under the test steps only when a defect is found.

B1

Testing and repair

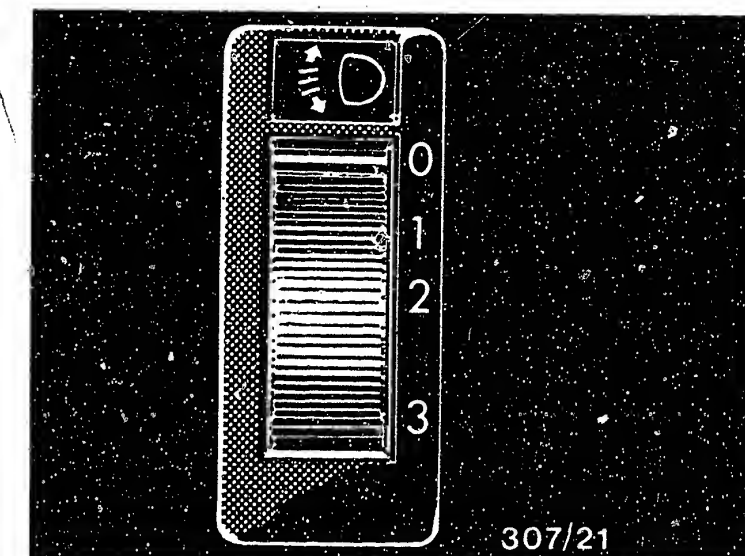
MB pass. cars, headl. vert. aim control



Test step 1: Vehicles without level control

Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. 0 684 100 ..		<u>Component:</u> Headlight
<u>Operation in vehicle:</u> Rheostat-type switch in basic position "0" (see upper illustration) (For this purpose, leave engine running and give two to three snap accelerations to ensure the availability of 0.4 bar vacuum at the control element).		<u>Operation:</u> Correct adjustment
<u>Headlight aiming device setting:</u> Set headlight aiming device to 10 cm inclination		<u>Malfunction:</u> Headlight not mechanically adjustable
<u>Operation in vehicle:</u> Set headlight to cutoff		

Headlight not mechanically adjustable:
 Check headlight for damage and replace if necessary.

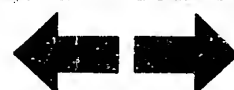


Rheostat-type switch
 0 = Driver's seat or driver's and passenger seats occupied
 1 = Rear seat bench occupied
 2 = Rear seat bench occupied and load in trunk. Driver's seat or driver's and passenger seats occupied and max. permissible load in trunk
 3 = May be necessary for trailer towing

B2

Testing and repair

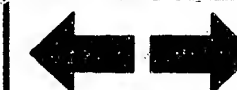
MB pass. cars, headl. vert. aim control



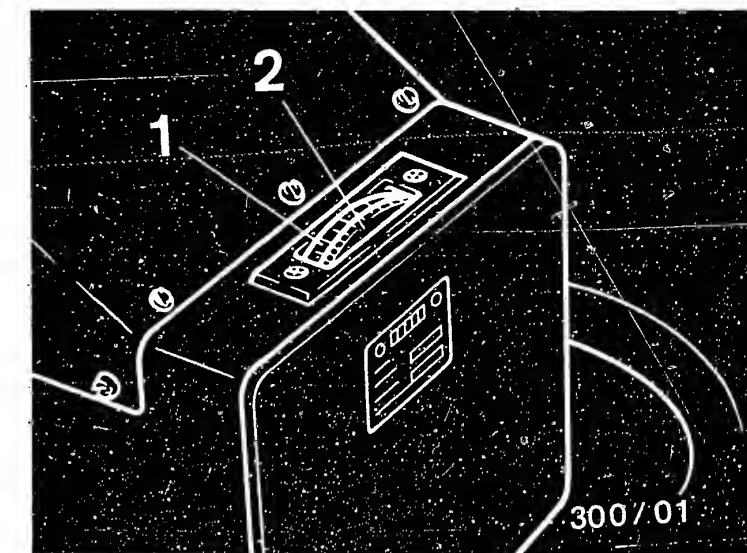
B3

Testing and repair

MB pass. cars, headl. vert. aim control



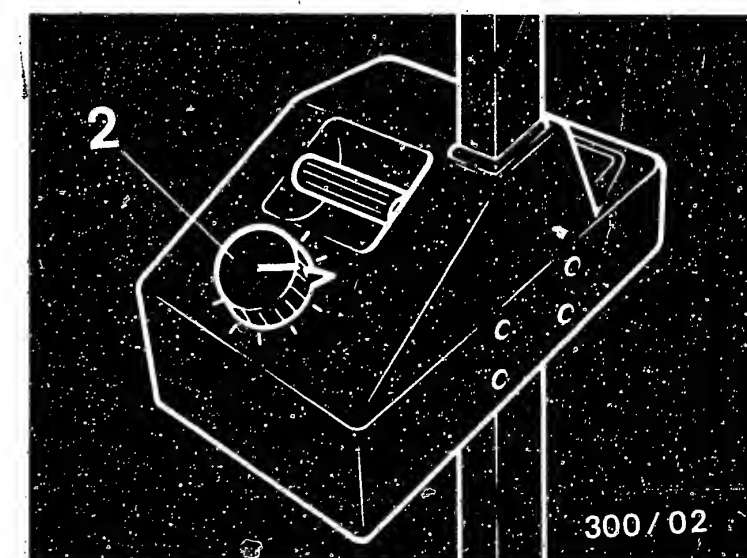
Test step 2: Vehicles without level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. (upper illustration) 0 684 100 .. (lower illustration)	At headlight aiming device: Cutoff between 33 and 48 cm inclination	<u>Component:</u> LWR system downwards adjustment
<u>Operation in vehicle:</u> Turn rheostat-type switch to level "3"		<u>Operation:</u> range of adjustment up/down
<u>Headlight aiming device setting:</u> Set to cutoff		<u>Malfunction:</u> Values not reached



- 1 = Adjustment scale
2 = Thumbwheel/rotary knob for setting level of inclination

Headlight adjustment only partially present.
Check complete vacuum system without supply reservoir for leakage and operation.

Continued on B6/B7



B4

Testing and repair

MB pass. cars, headl. vert. aim control



B5

Testing and repair

MB pass. cars, headl. vert. aim control



1. Trouble-shooting when headlight adjustment present only in part:

1.1 Check complete vacuum system for leaks

Disconnect violet/grey lead (upper illustration, pos.a) at branch piece 1 and connect vacuum pump together with vacuum tester to test connection A.

Note:

Control valve from vacuum tester is closed. Set rheostat-type switch to position "0" and build up a vacuum of 450 mbar - read at vacuum tester - with vacuum pump.

Permissible drop in vacuum - read at vacuum tester - 25 mbar within 10 seconds.

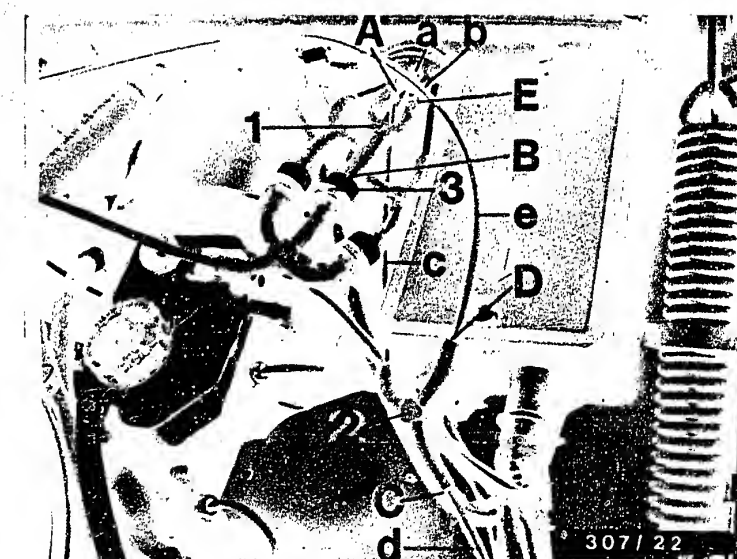
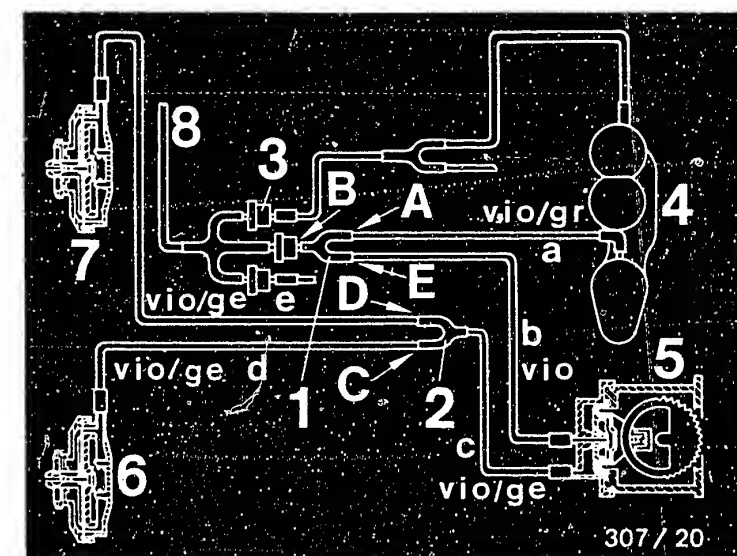
1.1.1 Drop in vacuum within 10 seconds greater than 25 mbar

Check non-return valve for leaks

Seal off pressure gauge from test connection A. Disconnect branch piece (1) from non-return valve (3) and connect pressure gauge to non-return valve (3) instead (see illustration).

Build up a vacuum of 300 mbar with vacuum pump - read at vacuum tester. Permissible drop in vacuum: 5 mbar/min.

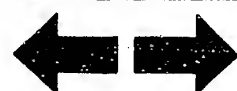
Continued on B8/B9



B6

Testing and repair

MB pass. cars, headl. vert. aim control



B7

Testing and repair

MB pass. cars, headl. vert. aim control



1.1.2 Check rheostat-type switch with instrument and control lead to branch piece for leaks

Seal off pressure gauge from non-return valve (3) and reconnect branch piece (1) to non-return valve (3).

Disconnect violet/yellow lead (c) from branch piece (2) and make a dummy connection.

Disconnect violet lead (illustration, pos. b) from branch piece (1) and connect to pressure gauge.

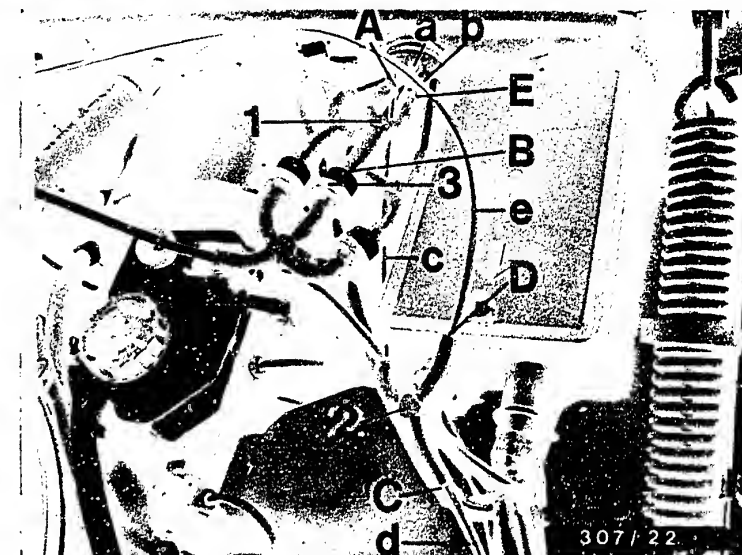
Set rheostat-type switch to position "0" and build up a vacuum of 450 mbar - read at pressure gauge of vacuum pump - with vacuum pump. Permissible drop in vacuum - read at vacuum tester - 30 mbar within 10 seconds.

1.1.3 Check actuator with instrument lead left/right for leaks

Seal off pressure gauge from violet lead (b) and reconnect this to branch piece (1). Remove dummy connection from violet/yellow lead (c) and reconnect to branch piece (2) (upper illustration).

Disconnect lead (d or e) to actuator from branch piece (2) and connect respective lead to pressure gauge. Build up a vacuum of 300 mbar - read at vacuum tester - with vacuum pump.

Permissible drop in vacuum: 5 mbar/min. Reconnect violet/gray lead (a) from supply reservoir to test connection A.



Continued on B10/B11

B8

Testing and repair

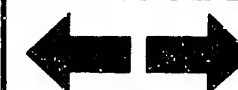
MB pass. cars, headl. vert. aim control



B9

Testing and repair

MB pass. cars, headl. vert. aim control



1.2 Drop in vacuum within 10 seconds less than 25 mbar:

1.2.1 Check operation of rheostat-type switch

Connect vacuum pump to violet lead (b) and pressure gauge to violet/yellow lead (c) (upper illustration). Set change-over cock of vacuum tester to position "B". Set rheostat-type switch to position "0". Build up a pressure of at least 450 mbar - read at pressure gauge of vacuum pump - with vacuum pump.

The vacuum indicated at the vacuum tester must be 400 ± 20 mbar.

Set rheostat-type switch to "3".

The vacuum indicated at the vacuum tester must be 50 ± 20 mbar.

If the specified values are not reached, replace rheostat-type switch.

1.2.2 Check reflectors left/right for freedom of movement

Remove cover of light unit and loosen actuator from bayonet socket by turning 45° . Disconnect control lead. Push out red fuse from actuator and disconnect actuator from ball end of tie rod.

Move reflector manually and check for freedom of movement.

1.2.3 Check actuator adjustment travel left/right

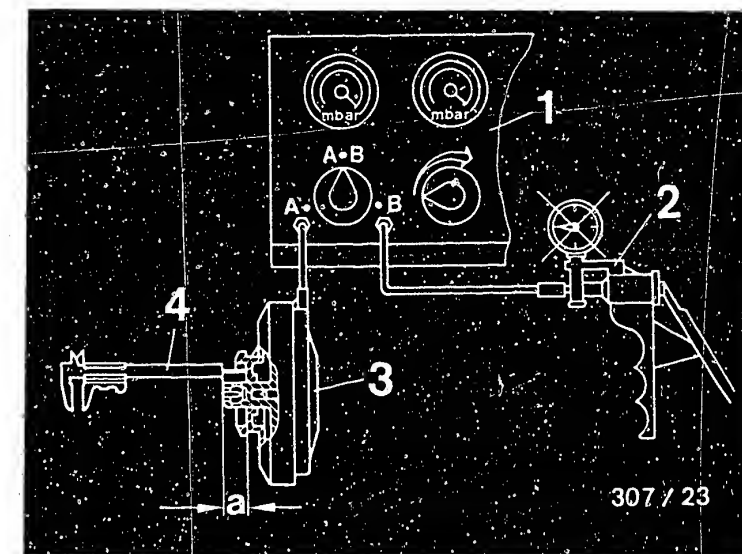
Connect vacuum pump and pressure gauge to violet lead (b) (lower illustration).

Set rheostat-type switch to position "0".

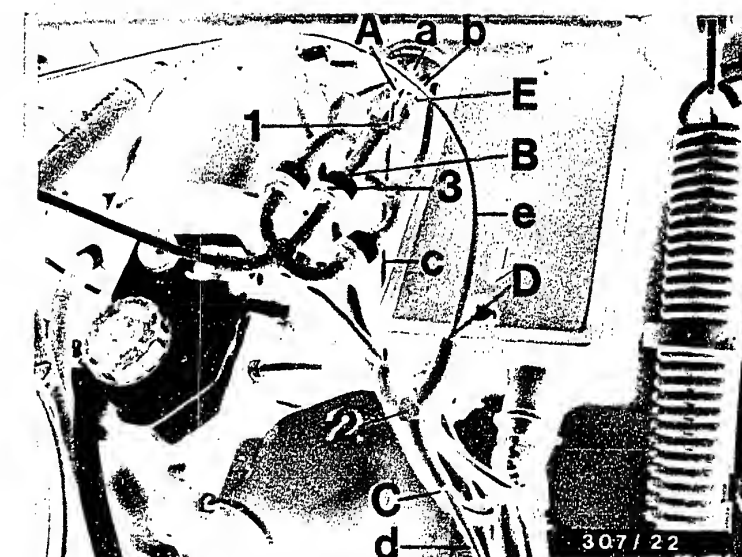
Build up a vacuum of at least 450 mbar - read at vacuum tester - with vacuum pump. Measure extension of piston with caliper gauge at actuator (upper illustration).

Set rheostat-type switch to position "3" and measure extension once more. If the differential value of the two measurements is less than 2.8 mm, replace actuator.

Note: Always refit red fuse again when assembling actuator.



- 1 = Vacuum tester
- 2 = Vacuum pump
- 3 = Actuator
- 4 = Caliper gauge



B 10

Testing and repair

MB pass. cars, headl. vert. aim control



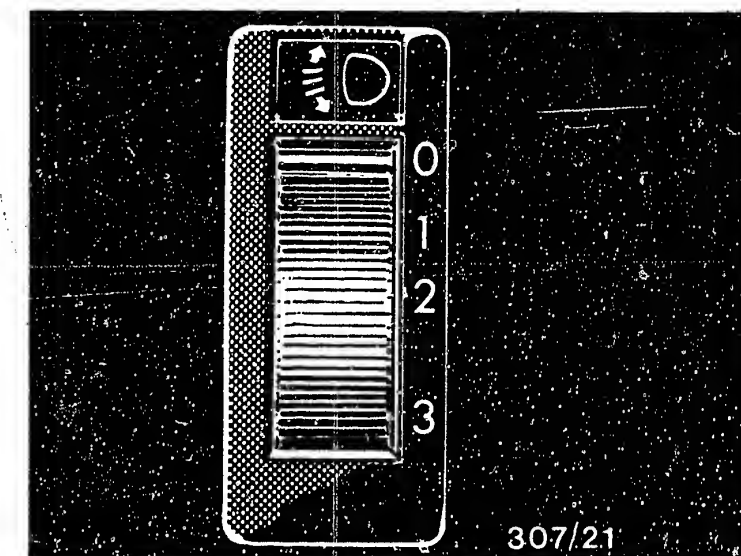
B 11

Testing and repair

MB pass. cars, headl. vert. aim control



Test step 3: Vehicles without level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. 0 684 100 ..		<u>Component:</u> Headlight
<u>Operation in vehicle:</u> Rheostat-type switch in basic setting "0" (see upper illustration) (For this purpose, leave engine running and give two to three snap accelerations to ensure the availability of 0.4 bar vacuum at the actuator).		<u>Operation:</u> Basic setting:
<u>Headlight aiming device setting:</u> Set headlight aiming device to 10 cm inclination		<u>Malfunction:</u> -----
<u>Operation in vehicle:</u> Set headlight to cutoff		



Rheostat-type switch

- 0 = Driver's seat or driver's and passenger seats occupied
- 1 = Rear seat bench occupied
- 2 = Rear seat bench occupied and load in trunk. Driver's seat or driver's and passenger seats and max. load in trunk
- 3 = May be required for trailer towing

When headlights are set to cutoff, the test is finished.

B12

Testing and repair

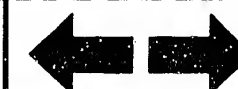
MB pass. cars, headl. vert. aim control



B13

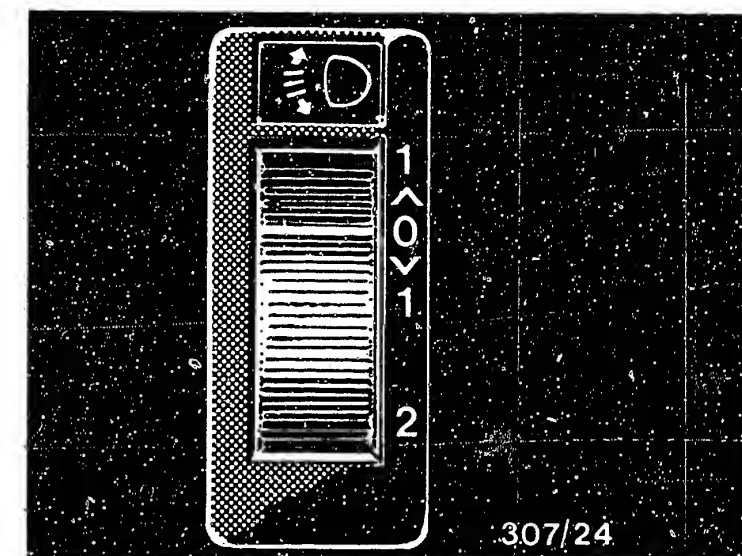
Testing and repair

MB pass. cars, headl. vert. aim control



Test step 1a: Vehicles with level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. 0 684 100 ..		<u>Component:</u> Headlight
<u>Operation in vehicle:</u> Rheostat-type switch at basic setting "0" (see upper illustration) (For this purpose, leave engine running and give two to three snap accelerations to ensure the availability of 0.4 bar vacuum at the actuator).		<u>Operation:</u> Correct setting
<u>Headlight aiming device setting:</u> Set headlight aiming device to 10 cm inclination		<u>Malfunction:</u> Headlight not mechanically adjustable
<u>Operation in vehicle:</u> Set headlight to cutoff (lower illustration)		

Not mechanically adjustable:
Check headlight for damage, replace if necessary.



Rheostat-type switch

- 1
Λ = Rear seat bench occupied
- 0 = Driver's seat or driver's and passenger seats occupied
- v
1 = Rear seat bench occupied and load in trunk. Driver's seat or driver's and passenger seats and max. load in trunk
- 2 = May be required for trailer towing.

B 14

Testing and repair

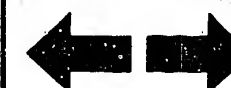
MB pass. cars, headl. vert. aim control



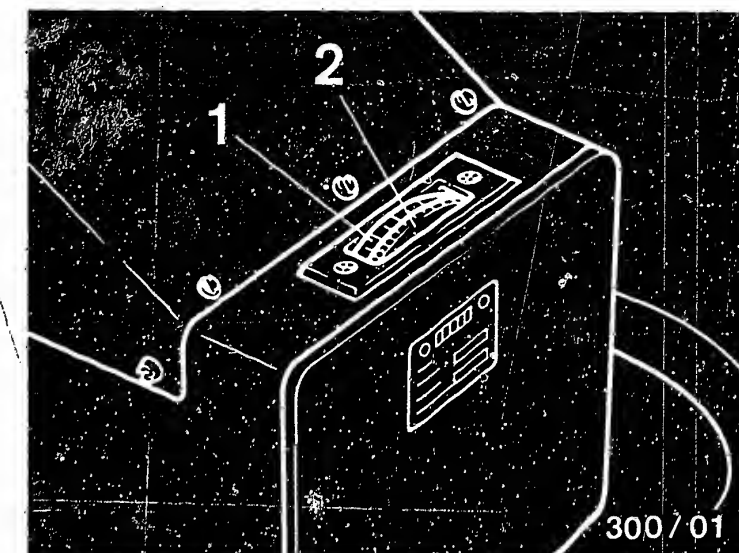
B 15

Testing and repair

MB pass. cars, headl. vert. aim control

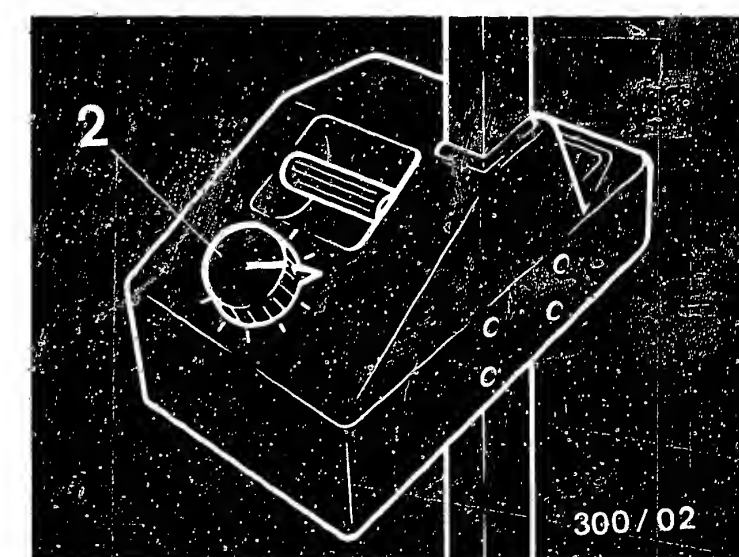


Test step 2a: Vehicles with level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. (upper illustration) 0 684 100 .. (lower illustration)	At headlight aiming device: Cutoff between <u>28 cm</u> and <u>35 cm</u> inclination	<u>Component:</u> LWR system Downward adjustment
<u>Operation in vehicle:</u> Rheostat-type switch in position "v" 2 (Reflectors pointing downwards)		<u>Operation:</u> Adjustment range up/down
<u>Headlight aiming device setting:</u> Set to cutoff		<u>Malfunction:</u> Values not reached



- 1 = Adjustment scale
2 = Thumbwheel or rotary knob for setting level of inclination

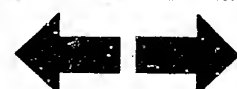
Headlight adjustment present only in part
Check complete vacuum system without the supply reservoir for leaks and operation.



B 16

Testing and repair

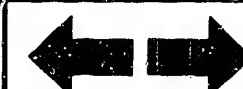
MB pass. cars, headl. vert. aim control



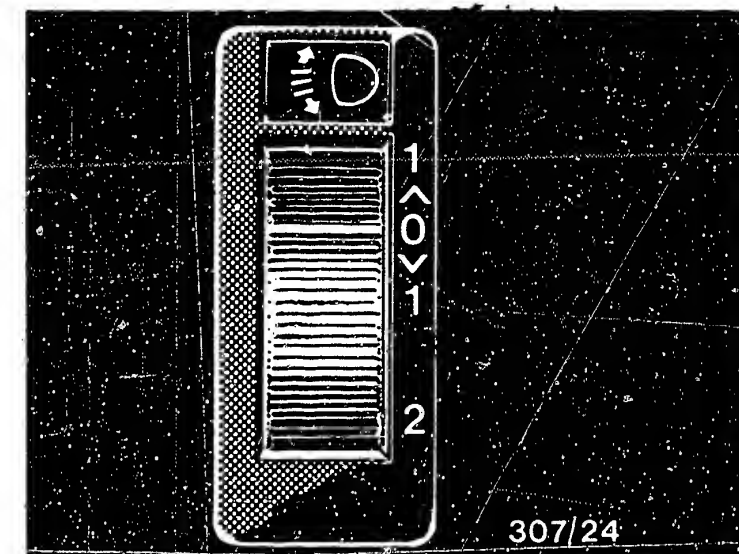
B 17

Testing and repair

MB pass. cars, headl. vert. aim control



Test step 3a: Vehicles with level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. 0 684 100 ..		<u>Component:</u> Headlight
<u>Operation in vehicle:</u> Rheostat-type switch in basic setting "0" (see upper illustration) (For this purpose, leave engine running and give two to three snap accelerations to ensure the availability of 0.4 bar vacuum at the actuator).		<u>Operation:</u> Correct setting
<u>Headlight aiming device setting:</u> Set headlight aiming device to 23 cm inclination		<u>Malfunction:</u> Headlight not mechanically adjustable
<u>Operation in vehicle:</u> Set headlight to cutoff		



Rheostat-type switch

1
Λ = Rear seat bench occupied
0 = Driver's seat or driver's and passenger seats occupied

v
1 = Rear seat bench occupied and load in trunk. Driver's seat or driver's and passenger seats and max. load in trunk.
2 = May be required for trailer towing

Headlight not mechanically adjustable:
Check headlights for damage, replace if necessary.

B18

Testing and repair

MB pass. cars, headl. vert. aim control



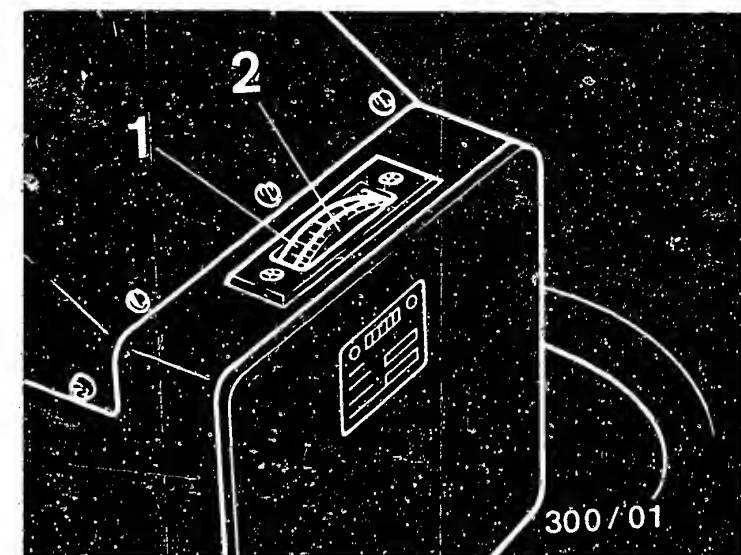
B19

Testing and repair

MB pass. cars, headl. vert. aim control



Test step 4a: Vehicles with level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. (upper illustration) 0 684 100 .. (lower illustration)	At headlight aiming device: Cutoff between 16 cm and 10 cm inclination	<u>Component:</u> LWR system Downward adjustment
<u>Operation in vehicle:</u> Rheostat-type switch in position "V" 2 (Reflectors pointing upwards)		<u>Operation:</u> Adjustment range up/down
<u>Headlight aiming device setting:</u> Set to cutoff		<u>Malfunction:</u> Values not reached

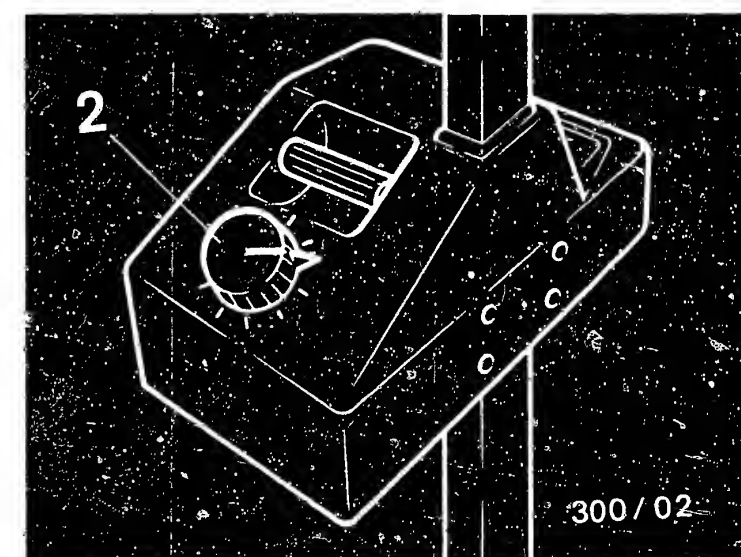


- 1 = Adjustment scale
2 = Thumbwheel or rotary knob for setting level of inclination

Headlight adjustment present only in part.

Check complete vacuum system without supply reservoir for leads and operation.

Continued on B22/B23



B20

Testing and repair

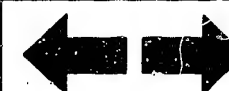
MB pass. cars, headl. vert. aim control



B21

Testing and repair

MB pass. cars, headl. vert. aim control



1.1.2 Check rheostat-type switch with instrument and control lead to branch piece for leaks

Seal off pressure gauge from non-return valve (3) and reconnect branch piece (1) to non-return valve (3).

Disconnect violet/yellow lead (c) from branch piece (2) and make a dummy connection.'

Disconnect violet lead (illustration, pos. b) from branch piece (1) and connect to pressure gauge.

Set rheostat-type switch to position ¹ A and build up a vacuum of 450 mbar - read at pressure gauge of vacuum pump - with vacuum pump. Permissible drop in vacuum - read at vacuum tester - 30 mbar within 10 seconds.

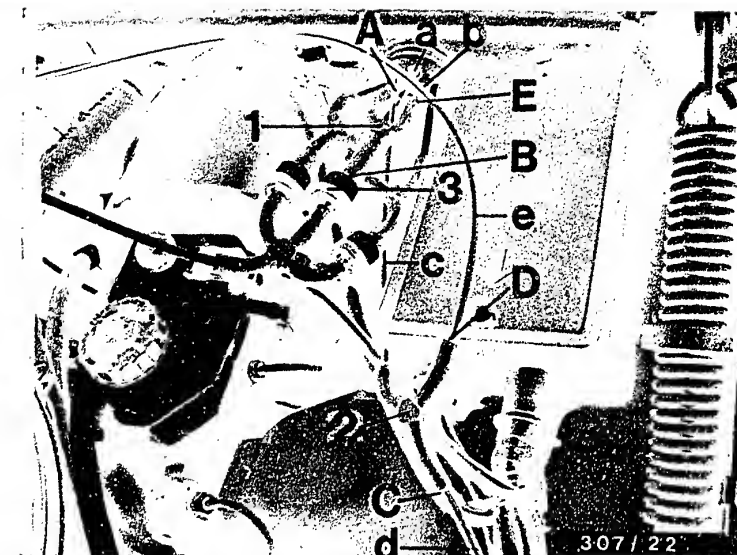
1.1.3 Check actuator with instrument lead left/right for leaks

Seal off pressure gauge from violet lead (b) and reconnect this to branch piece (1). Remove dummy connection from violet/yellow lead (c) and reconnect to branch piece (2) (upper illustration).

Disconnect lead (d or e) to actuator from branch piece (2) and connect respective lead to pressure gauge. Build up a vacuum of 300 mbar - read at vacuum tester - with vacuum pump.

Permissible drop in vacuum: 5 mbar/min. Reconnect violet/gray lead (a) of supply reservoir to test connection A.

Continued on C3/C4



1.2 Drop in vacuum within 10 seconds less than 25 mbar!

1.2.1 Check operation of rheostat-type switch

Connect vacuum pump to violet lead (b) and pressure gauge to violet/yellow lead (c) (see lower illustration). Set change-over cock of vacuum tester to position "B". Set rheostat-type switch to position A. Build up a vacuum of at least 450 mbar - read at pressure gauge of vacuum pump - with vacuum pump.

The vacuum indicated at the vacuum tester must be 400 ± 20 mbar.

Set rheostat-type switch to position "0".

The vacuum indicated to the vacuum tester must be 290 ± 20 mbar.

Set rheostat-type switch to position $\overset{V}{2}$.

The vacuum indicated at the vacuum tester must be 50 ± 20 mbar.

If the specified values are not reached, replace rheostat-type switch.

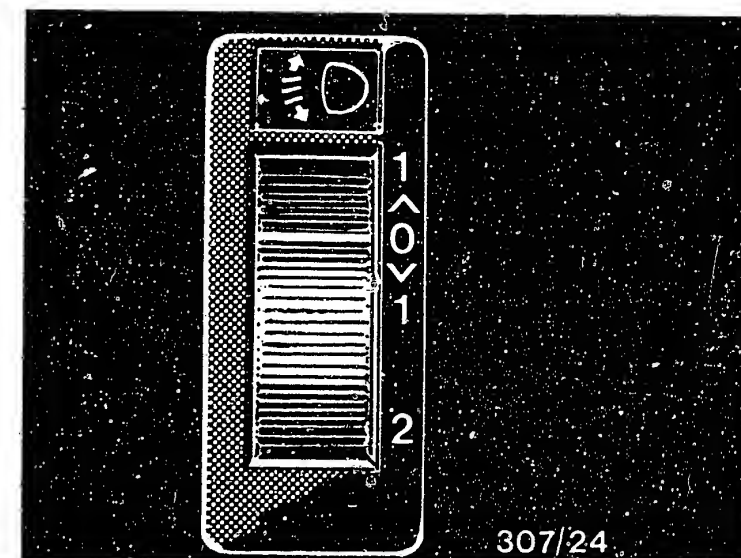
1.2.2 Check reflector for freedom of movement to left and right

Disassemble cover of light unit and loosen actuator from bayonet socket by turning 45°. Disconnect control lead.

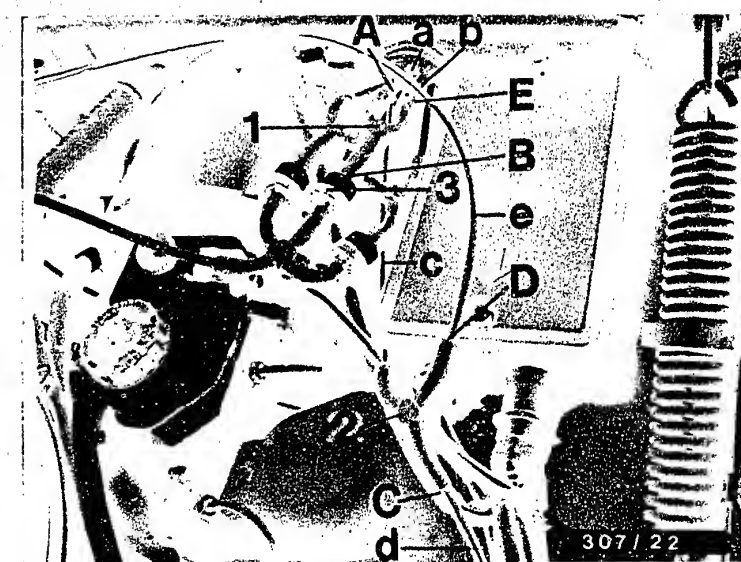
Push out red fuse from actuator and disconnect actuator from ball end of tie rod.

Move reflector manually and check freedom of movement.

Continued on C5/6



Rheostat-type switch



C3

Testing and repair

MB pass. cars, headl. vert. aim control



C4

Testing and repair

MB pass. cars, headl. vert. aim control



1.2.3 Check actuator adjustment travel to left and right

Connect vacuum pump and pressure gauge to violet lead (b) (see lower illustration).

Set rheostat-type switch to position Λ .

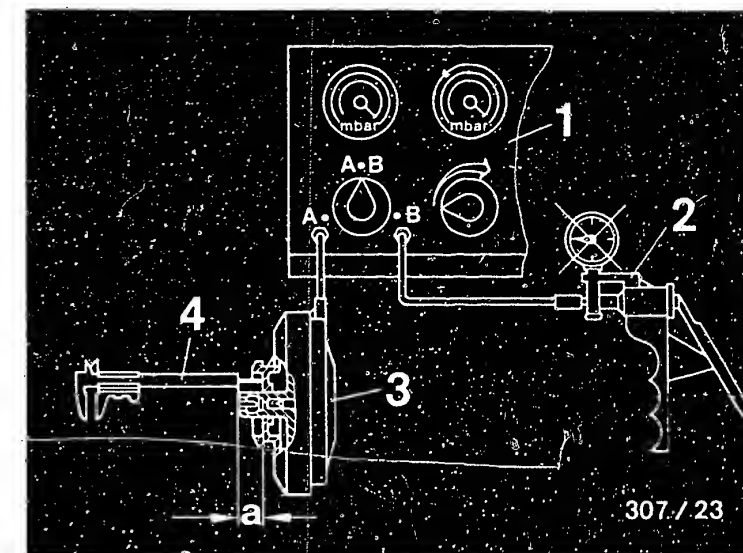
Build up a vacuum of at least 450 mbar - read at vacuum tester - with vacuum pump. Measure extension of piston with caliper gauge at actuator (see upper illustration).

Set rheostat-type switch to position "0" and measure extension once more. If the differential value of the two measurements is less than 0.6 mm, replace actuator.

Set rheostat-type switch to position \vee and measure extension once more. If the differential value of the two measurements (position "0" and position \vee) is less than 1.7 mm, replace actuator.

Note:

Always refit red fuse when assembling the actuator.



- 1 = Vacuum tester
- 2 = Vacuum pump
- 3 = Actuator
- 4 = Caliper gauge

C5

Testing and repair

MB pass. cars, headl. vert. aim control



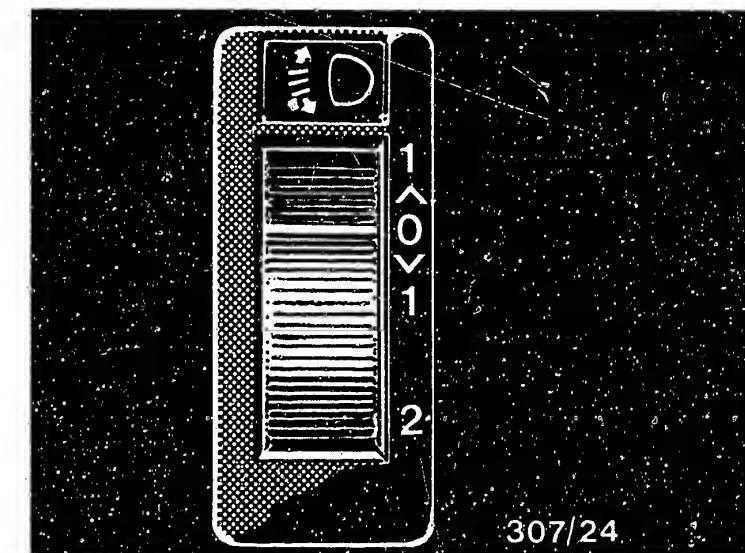
C6

Testing and repair

MB pass. cars, headl. vert. aim control



Test step 5a: Vehicles with level control		
Operation	Reading	Testing
<u>Measuring equipment:</u> Headlight aiming device 0 681 130 .. 0 684 100 ..		<u>Component:</u> Headlight
<u>Operation in vehicle:</u> Rheostat-type switch in basic setting "0" (see upper illustration) (For this purpose, leave engine running and give two to three snap accelerations to ensure the availability of 0.4 bar vacuum at the actuator).		<u>Operation:</u> Basic setting
<u>Headlight aiming device setting:</u> Set headlight aiming device to 10 cm inclination		<u>Malfunction:</u> -----
<u>Operation in vehicle:</u> Set headlight to cutoff (lower illustration)		



Rheostat-type switch

1
Λ = Rear seat bench occupied
0 = Driver's seat or driver's and passenger seats occupied

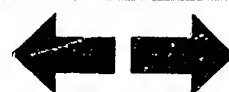
Λ
1 = Rear seat bench occupied and load in trunk. Driver's seat or driver's and passenger seats max. load in trunk.
2 = May be required for trailer towing

When headlights are set at cutoff, the test is finished

C7

Testing and repair

MB pass. cars, headl. vert. aim control



C8

Testing and repair

MB pass. cars, headl. vert. aim control



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